

Docket No. AUS9200400009US1

**METHOD AND APPARATUS FOR AUTOMATIC E-MAIL RESPONSE  
INTERRUPTION BASED ON USER ACTIVITY**

**BACKGROUND OF THE INVENTION**

**1. Technical Field:**

The present invention relates generally to an improved data processing system for processing and displaying messages. In particular, the present invention provides an electronic mail messaging system for automatic e-mail response interruption based on user activity.

**2. Description of Related Art:**

E-mail allows a person to quickly and easily send textual messages and other information, such as, for example, pictures, sound recordings, and formatted documents electronically to other e-mail users anywhere in the world. An e-mail system typically involves a server-based mail program residing on a server computer to manage the exchange of e-mail messages over one or more networks and a client-based mail program residing on the client to implement a mail box that receives and holds the e-mail messages for a user. Typically, these client-based programs also include a graphical user interface to enable a user to easily and conveniently open and read e-mail messages in addition to creating new e-mail messages.

An e-mail user will typically create a message using an e-mail program running on a computer connected to a

Docket No. AUS9200400009US1

computer network, such as a local area network (LAN), a wide area network (WAN), or the Internet. The message will include an e-mail "address" for the intended recipient. When the user has finished entering the message, the user may "send" the message to the intended recipient. The e-mail program then electronically transmits the message over the computer network. The recipient, using an e-mail program running on the recipient's computer, can then "receive" the message.

One problem with such an e-mail system is that important messages requiring immediate action may be overlooked if the recipient is forced to sort through a mass of e-mails. Computer users may be busy at their computer terminals, focused on solving customer problems or writing relevant technical documents or references. As the influx of new e-mail to a recipient may be constant and rapid, it may be difficult for a user, while visually scanning the inbox, to quickly identify important e-mail messages. In some cases, a user may receive hundreds of e-mail messages in a single day. Scanning the inbox is subject to user error in skipping or missing a message.

One solution to this identification problem is for the sender to indicate that the message content is important. Currently available e-mail systems employ e-mail flags to convey this critical information to the recipient. For example, an "urgent" flag setting may be used to indicate that an e-mail contains important information. The sender designates a message as urgent by selecting an option in the e-mail client prior to

Docket No. AUS9200400009US1

sending the message to the intended recipient. This "urgent" designation is appended to the message and subsequently displayed in an information field associated with the e-mail. For example, an information field of an e-mail may be populated with an exclamation mark (!) to indicate that the message is urgent. Consequently, when the e-mail is displayed in the inbox, the user may distinguish this urgent e-mail from other e-mails in the inbox due to the exclamation mark associated with the urgent e-mail. However, flag settings merely signify to the recipient that an e-mail, shown within the inbox, contains important information and needs to be read. In addition, current e-mail systems do not provide a clear indication that a particular response from the recipient is pending. Thus, current e-mail systems simply allow a recipient to identify important messages displayed in an inbox.

Therefore, it would be advantageous to have an improved method, apparatus, and computer instructions for indicating to an e-mail recipient that a particular e-mail is important and requires immediate action by providing automatic e-mail response interruption based on user activity. It would further be advantageous to have a mechanism for providing a clear indication that a response from the recipient is pending.

Docket No. AUS9200400009US1

### **SUMMARY OF THE INVENTION**

The present invention provides an e-mail type designation that allows for issuing an automatic e-mail response interruption based on user activity. An e-mail message, having an "interrupt" type designation, is sent from an originator and directed to one or more recipients. The receiving e-mail client filters incoming messages and determines whether the e-mail contains an interrupt designation. If an interrupt designation is found, the e-mail client automatically displays content of the interrupt email and any pending actions required of the recipient in a forefront position in the user interface on the client, such as through a popup window. The display of the interrupt e-mail content may be valid until the recipient has responded to the e-mail or completes the pending action specified in the e-mail. Due to the automatic presentation of the interrupt e-mail, the recipient is able to quickly and easily view critical e-mail messages, as well as complete the e-mail task or questions. The display of the interrupt e-mail content also provides a clear indication that a response from the recipient is still pending.

Furthermore, the use of the interrupt type designation may be controlled based on the sender's authority to issue an interrupt e-mail to a particular recipient. The authority to send an interrupt e-mail to a particular recipient may be predicated on the establishment of an organizational hierarchy based on the user's selection. For example, the user may establish an

Docket No. AUS9200400009US1

organizational hierarchy, wherein the authority to issue an interrupt e-mail to the user are assigned to individuals according to a user-defined organizational hierarchy. Client software may perform a directory lookup against the sending and receiving users when a message is delivered. Alternatively, the authority to issue an interrupt e-mail may be predicated on an external source, such as a corporate directory. A corporate directory has inherent properties regarding organizational structure, such as employee and employer relationship, manager and subordinate relationship, and hierarchical relationship.

**BRIEF DESCRIPTION OF THE DRAWINGS**

The novel features believed characteristic of the invention are set forth in the appended claims. The invention itself, however, as well as a preferred mode of use, further objectives and advantages thereof, will best be understood by reference to the following detailed description of an illustrative embodiment when read in conjunction with the accompanying drawings, wherein:

**Figure 1** depicts a representation of a network of data processing systems in which the present invention may be implemented;

**Figure 2** is a block diagram of a data processing system that may be implemented as a server in accordance with a preferred embodiment of the present invention;

**Figure 3** is a block diagram illustrating a data processing system in which the present invention may be implemented;

**Figure 4** is a block diagram of an exemplary electronic mail messaging system in accordance with a preferred embodiment of the present invention;

**Figure 5** are examples of graphical user interfaces that allow for designating an e-mail message as type "interrupt" in accordance with a preferred embodiment of the present invention;

**Figure 6** is an example popup messaging window for indicating the receipt of an important e-mail message in accordance with a preferred embodiment of the present invention;

Docket No. AUS9200400009US1

**Figure 7** is a flowchart of a process for issuing an e-mail message of type "interrupt" in accordance with a preferred embodiment of the present invention; and

**Figure 8** is a flowchart of a process for handling receipt of an e-mail message of type "interrupt" in accordance with a preferred embodiment of the present invention.

**DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT**

With reference now to the figures, **Figure 1** depicts a network of data processing systems in which the present invention may be implemented. Network data processing system **100** is a network of computers in which the present invention may be implemented. Network data processing system **100** contains a network **102**, which is the medium used to provide communications links between various devices and computers connected together within network data processing system **100**. Network **102** may include connections, such as wire, wireless communication links, or fiber optic cables.

In the depicted example, server **104** is connected to network **102** along with storage unit **106**. In addition, clients **108**, **110**, and **112** are connected to network **102**. These clients **108**, **110**, and **112** may be, for example, personal computers or network computers or personal digital assistants (PDA) devices. In the depicted example, server **104** provides data, such as boot files, operating system images, and applications to clients **108-112**. Clients **108**, **110**, and **112** are clients to server **104**. Server **104** may act as an instant messaging server to facilitate the exchange of messages between users at clients, such as clients **108**, **110**, and **112**. Network data processing system **100** may include additional servers, clients, and other devices not shown.

In the depicted example, network data processing system **100** is the Internet with network **102** representing a worldwide collection of networks and gateways that use the



Docket No. AUS9200400009US1

Transmission Control Protocol/Internet Protocol (TCP/IP) suite of protocols to communicate with one another. At the heart of the Internet is a backbone of high-speed data communication lines between major nodes or host computers, consisting of thousands of commercial, government, educational and other computer systems that route data and messages. Of course, network data processing system **100** also may be implemented as a number of different types of networks, such as for example, an intranet, a local area network (LAN), or a wide area network (WAN). **Figure 1** is intended as an example, and not as an architectural limitation for the present invention.

Referring to **Figure 2**, a block diagram of a data processing system that may be implemented as a server, such as server **104** in **Figure 1**, is depicted in accordance with a preferred embodiment of the present invention. Data processing system **200** may be a symmetric multiprocessor (SMP) system including a plurality of processors **202** and **204** connected to system bus **206**. Alternatively, a single processor system may be employed. Also connected to system bus **206** is memory controller/cache **208**, which provides an interface to local memory **209**. I/O bus bridge **210** is connected to system bus **206** and provides an interface to I/O bus **212**. Memory controller/cache **208** and I/O bus bridge **210** may be integrated as depicted.

Peripheral component interconnect (PCI) bus bridge **214** connected to I/O bus **212** provides an interface to PCI local bus **216**. A number of modems may be connected to PCI local bus **216**. Typical PCI bus implementations will

Docket No. AUS9200400009US1

support four PCI expansion slots or add-in connectors. Communications links to clients **108-112** in **Figure 1** may be provided through modem **218** and network adapter **220** connected to PCI local bus **216** through add-in boards.

Additional PCI bus bridges **222** and **224** provide interfaces for additional PCI local buses **226** and **228**, from which additional modems or network adapters may be supported. In this manner, data processing system **200** allows connections to multiple network computers. A memory-mapped graphics adapter **230** and hard disk **232** may also be connected to I/O bus **212** as depicted, either directly or indirectly.

Those of ordinary skill in the art will appreciate that the hardware depicted in **Figure 2** may vary. For example, other peripheral devices, such as optical disk drives and the like, also may be used in addition to or in place of the hardware depicted. The depicted example is not meant to imply architectural limitations with respect to the present invention.

The data processing system depicted in **Figure 2** may be, for example, an IBM eServer pSeries system, a product of International Business Machines Corporation in Armonk, New York, running the Advanced Interactive Executive (AIX) operating system or LINUX operating system.

With reference now to **Figure 3**, a block diagram illustrating a data processing system is depicted in which the present invention may be implemented. Data processing system **300** is an example of a client computer. Data processing system **300** employs a peripheral component interconnect (PCI) local bus architecture. Although the

Docket No. AUS9200400009US1

depicted example employs a PCI bus, other bus architectures such as Accelerated Graphics Port (AGP) and Industry Standard Architecture (ISA) may be used. Processor **302** and main memory **304** are connected to PCI local bus **306** through PCI bridge **308**. PCI bridge **308** also may include an integrated memory controller and cache memory for processor **302**. Additional connections to PCI local bus **306** may be made through direct component interconnection or through add-in boards. In the depicted example, local area network (LAN) adapter **310**, SCSI host bus adapter **312**, and expansion bus interface **314** are connected to PCI local bus **306** by direct component connection. In contrast, audio adapter **316**, graphics adapter **318**, and audio/video adapter **319** are connected to PCI local bus **306** by add-in boards inserted into expansion slots. Expansion bus interface **314** provides a connection for a keyboard and mouse adapter **320**, modem **322**, and additional memory **324**. Small computer system interface (SCSI) host bus adapter **312** provides a connection for hard disk drive **326**, tape drive **328**, and CD-ROM drive **330**. Typical PCI local bus implementations will support three or four PCI expansion slots or add-in connectors.

An operating system runs on processor **302** and is used to coordinate and provide control of various components within data processing system **300** in **Figure 3**. The operating system may be a commercially available operating system, such as Windows XP, which is available from Microsoft Corporation. An object oriented programming system such as Java may run in conjunction with the operating system and provide calls to the operating system

Docket No. AUS9200400009US1

from Java programs or applications executing on data processing system **300**. "Java" is a trademark of Sun Microsystems, Inc. Instructions for the operating system, the object-oriented programming system, and applications or programs are located on storage devices, such as hard disk drive **326**, and may be loaded into main memory **304** for execution by processor **302**.

Those of ordinary skill in the art will appreciate that the hardware in **Figure 3** may vary depending on the implementation. Other internal hardware or peripheral devices, such as flash read-only memory (ROM), equivalent nonvolatile memory, or optical disk drives and the like, may be used in addition to or in place of the hardware depicted in **Figure 3**. Also, the processes of the present invention may be applied to a multiprocessor data processing system.

The depicted example in **Figure 3** and above-described examples are not meant to imply architectural limitations. For example, data processing system **300** also may be a notebook computer or hand held computer in addition to taking the form of a PDA. Data processing system **300** also may be a kiosk or a Web appliance.

The present invention allows an e-mail sender to issue an interrupt e-mail to a recipient. This e-mail message includes an interrupt indicator in the form of either specific content within the subject line of the message, or a tag appended to the message to indicate that the message is designated as a type "interrupt". When an e-mail message is sent to a recipient, the receiving e-mail client filters the message to identify

Docket No. AUS9200400009US1

whether an e-mail contains an interrupt designation. For example, an interrupt designation of "/INTERRUPT" may be placed within the subject line of the e-mail message. If the receiving e-mail client has been configured to filter those messages that contain "/INTERRUPT" within the subject line of the e-mail message, the e-mail client may display the e-mail content not only within the e-mail client, but also display the e-mail content and any pending actions required of the recipient in such a manner as to attract the recipient's attention, such as through a popup window.

In an alternative example, the sender may select a flag option provided on the message interface in order to designate the e-mail as an interrupt e-mail. This interrupt flag may be included in the header or footer of the e-mail. When the receiving e-mail client filters the header or footer of the incoming e-mail, the interrupt tag is detected. As a result, the receiving e-mail client will handle the e-mail as an interrupt e-mail and display the e-mail content and any pending actions required of the recipient in such a manner as to attract the recipient's attention, such as through a popup window.

Due to the presentation of a popup window, a recipient is able to quickly and easily view critical e-mail messages, as well as complete the e-mail task or questions. The e-mail popup window may be valid until the recipient has responded to the e-mail or completes the pending action specified in the e-mail. The popup

Docket No. AUS9200400009US1

window also provides a clear indication that a response from the recipient is pending.

In addition, the use of the interrupt type designation may be controlled based on the sender's authority to issue an interrupt e-mail to a particular recipient. A user may establish an organizational hierarchy, wherein the authority to issue an interrupt e-mail to the user are assigned to individuals according to a user-defined organizational hierarchy. Client software may perform a directory lookup against the sending and receiving users when a message is delivered.

Alternatively, an external source may be used to provide an authority list, such as a corporate telephone directory. A corporate telephone directory has inherent properties regarding organizational structure, such as employee and employer relationship, manager and subordinate relationship, and hierarchical relationship.

Turning now to **Figure 4**, a diagram illustrating an exemplary electronic mail messaging system **400** is depicted in accordance with a preferred embodiment of the present invention. In this example, e-mail client **402**, e-mail client **404**, and e-mail client **406** are e-mail clients, programs, or applications located at different client data processing systems, such as client **108**, client **110**, and client **112** in **Figure 1**. Message file **408**, message file **410**, and message file **412** are associated with these e-mail clients. These message files serve to store e-mail messages received by the clients and may be organized into various mailboxes. Examples of various mailboxes include, for example, an in

Docket No. AUS9200400009US1

folder, a sent folder, a deleted folder, and an outbox folder.

These e-mail programs may employ different protocols depending upon the implementation. For example, simple mail transfer protocol (SMTP) is a standard e-mail protocol that is based on TCP/IP. This protocol defines a message format and the message transfer agent, which stores and forwards the mail. Other protocols, such as post office protocol 3 (POP3), also may be employed.

These e-mail programs are used to send e-mail back and forth to different users through e-mail server **414**. Messages sent to other e-mail clients are stored in e-mail message database **416**. When an e-mail client connects to e-mail server **414**, any messages for that particular client are then sent to the client.

E-mail clients **402**, **404**, and **406** may be implemented using presently available e-mail clients with an additional process or feature in which these clients now look for e-mail type designation as described above.

Turning next to **Figure 5**, an exemplary e-mail messaging window that allows for designating an e-mail message as type "interrupt" is depicted in accordance with a preferred embodiment of the present invention. The components illustrated in **Figure 5** may be found in an e-mail client, such as e-mail client **402**, **404**, or **406** in **Figure 4**. These components may be implemented in a data processing system, such as data processing system **300** in **Figure 3**.

When a user wants to issue an e-mail, a messaging window, such as message window **500** shown in **Figure 5**, may

Docket No. AUS9200400009US1

be created. The upper portion of the e-mail messaging window typically, but not necessarily, contains various administration information **502** regarding the e-mail, such as the recipients of the message (TO: field **504** and CC: field **506**) and subject line **508**. Following administration information **502** is the text **510** of the e-mail message, and may contain various inquiries/questions or other types of solicitation that the sender is asking or requesting of the recipient. For example, in this e-mail message there are inquiries of "What were the defects found for the problem relating to close waits?" and "Can you give me an analysis of potential solutions?" Also, the e-mail message includes a directive of "Review the following documents and determine if they have any value to helping the customer." The present invention allows a user to designate an e-mail as an interrupt e-mail prior to sending the e-mail to a recipient. Accordingly, the user may include an indicator in subject line **508** of the e-mail to allow a recipient e-mail system to identify that the e-mail is an interrupt e-mail. For example, the indicator "/INTERRUPT" may be included subject line **508**, such that subject line **508** now reads, "/INTERRUPT Defect 1010 update requested". The e-mail message may then be sent to the intended recipients with the included interrupt indicator.

Another method of including an interrupt indicator within an e-mail message is using a selectable flag in an existing e-mail system, such as urgent flag option **512**. Rather than populating the subject line with an interrupt indicator, the user may select urgent flag option **512**



Docket No. AUS9200400009US1

prior to sending the e-mail to designate the e-mail as an interrupt e-mail. The e-mail system software may be modified to attach a tag to the header or footer of the e-mail message when urgent flag option **512** is selected, such that a receiving e-mail system may detect that the incoming e-mail message is an interrupt e-mail. The e-mail message may then be sent to the intended recipients with the attached interrupt indicator.

It should be noted that the selectable flag option in **Figure 5** may also be a flag specially created as an interrupt flag, so as to provide the sender with another level of e-mail designation type in addition to the urgent flag option.

With reference now to **Figure 6**, an example popup messaging window for indicating the receipt of an important e-mail message is depicted in accordance with a preferred embodiment of the present invention. Popup window **600** is presented for purposes of illustration and not meant as a limitation as to how messages may be presented. Popup window **600** is displayed when an interrupt e-mail message is received from another user.

In this example, popup window **600** is a messaging window displaying content **602** of the interrupt e-mail, including any pending actions required by the recipient. Although popup window **600** is illustrated as displaying the entire content of the e-mail, it should be noted that only a portion of the e-mail may be shown in popup window **600**, such as, for example, the subject line. In this situation, the recipient is directed to the recipient's inbox, wherein the entire e-mail message may be viewed.

Docket No. AUS9200400009US1

When an interrupt e-mail is received at an e-mail client, such as e-mail client **402** in **Figure 4**, the e-mail client detects this type of e-mail and immediately displays the content of the e-mail in a popup window, such as popup window **600**. Popup window **600** is brought to a forefront position of the user interface, and remains active in these illustrative examples until the user completes the e-mail inquiry or requested action by responding to the e-mail or by completing the requested task specified in the e-mail.

Popup window **600** may also include quick-reply buttons, such as reply button **604** and action completed button **606**. Selecting reply button **604** may result in the generation of a reply message window, through which the recipient of the interrupt e-mail may respond to the sender. Selecting action completed button **606** may result in an automatic e-mail being sent back to the interrupt e-mail sender in order to notify the sender that the recipient has completed the action specified in the e-mail.

Note that popup window **600** preferably does not include a "close" button. Popup window **600** may be closed by replying to the sender or by completing the action specified in the e-mail. By preventing the recipient from closing popup window **600**, the present invention may provide a clear indication that a particular response from the recipient is still pending.

Thus, as described above, instead of marking an e-mail message as important and having the important message placed in the recipient's inbox with other

Docket No. AUS9200400009US1

incoming messages where it may be overlooked or ignored, a popup window is displayed at the forefront of the recipient's desktop for an e-mail message designated as an interrupt e-mail. Various popup window displays may be used to differentiate messages of type interrupt from other normal messages in order to draw the user's attention to these important messages. In this manner, a user may easily be informed of messages that require immediate action than others received during an instant message session.

Turning next to **Figure 7**, a flowchart of a process for issuing an e-mail message of type "interrupt" is depicted in accordance with a preferred embodiment of the present invention. The process illustrated in **Figure 7** may be implemented in an e-mail messaging system, such as e-mail system **400** in **Figure 4**.

The process begins by generating a new e-mail message (step **702**). Next, the sender designates the new e-mail message as an interrupt e-mail (step **704**). An e-mail may be designated as an interrupt e-mail by using an indicator in the form of either specific content within the subject line of the message, or a tag appended to the message to indicate that the message is designated as a type "interrupt". For example, the sender may designate an e-mail as an interrupt e-mail by including an interrupt indicator, such as "/INTERRUPT", within the subject line of the message. Alternatively, a menu option may be provided to the sender. When the menu option is selected, this results in the message being designated as an interrupt e-mail through a tag attached

Docket No. AUS9200400009US1

to the header or footer of the message. The e-mail client then sends the e-mail to the intended recipients (step 706).

As mentioned previously, when an e-mail message is sent to a recipient, the receiving e-mail client filters the message to identify whether an e-mail contains an interrupt designation. If the receiving e-mail client determines that the incoming e-mail is an interrupt e-mail, the e-mail client automatically displays the content of the interrupt e-mail message and any pending actions required of the recipient, such as through a popup window.

For example, if an interrupt designation is placed within the subject line of the e-mail message and the receiving e-mail client has been configured to filter those messages that contain a specific interrupt designation within the subject line, the e-mail client may generate a popup window containing the e-mail content and any pending actions required of the recipient.

In an alternative example, the sender may select a flag option provided on the message interface in order to designate the e-mail as an interrupt e-mail. This interrupt flag may be attached to the header or footer of the e-mail. When the receiving e-mail client filters the header or footer of the incoming e-mail, the interrupt tag is detected. As a result, the receiving e-mail client handles the e-mail as an interrupt e-mail and generates a popup window containing the e-mail content and any pending actions required of the recipient message.

Docket No. AUS9200400009US1

In some circumstances, however, it may be desirable to limit the ability to issue an interrupt e-mail. The use of the interrupt type designation may be controlled based on the sender's authority to issue an interrupt e-mail to a particular recipient. The authority to send an interrupt e-mail to a particular recipient may be predicated on the establishment of an organizational hierarchy based on a user's selection or on an external list, such as a corporate telephone directory. A directory look-up using the organizational hierarchy is performed to determine the relationship of the sender and recipients when an e-mail message is generated. From the hierarchy relationship, it may be determined whether the sender may issue an interrupt e-mail to a particular recipient.

In an illustrative embodiment, an employee's superior, such as a manager, may be granted the authority to issue an interrupt e-mail to the employee. In a similar fashion, the employee's peers may be able to issue interrupt e-mails to the employee. However, the employee may not be granted the authority to send an interrupt e-mail to a manager, since the manager is higher in the organizational hierarchy of the corporation. Thus, the use of interrupt e-mails may be controlled based on the hierarchical relationship between the sender and recipient.

Turning next to **Figure 8**, a flowchart of a process for handling receipt of an e-mail message of type "interrupt" is depicted in accordance with a preferred embodiment of the present invention. The process

Docket No. AUS9200400009US1

illustrated in **Figure 8** may be implemented in an e-mail messaging system, such as e-mail system **400** in **Figure 4**.

The process begins by receiving a new e-mail message (step **802**). The receiving e-mail client then analyzes the type designation of the incoming message and determines if the message is an interrupt e-mail (step **804**). The e-mail client may determine if the message is an interrupt e-mail by implementing filtering procedures present in existing e-mail system. For example, the e-mail client may be configured to filter on the contents of the subject line. Thus, if the subject line included an interrupt designation, the e-mail client may distinguish incoming interrupt e-mails from normal e-mails. Alternatively, the e-mail client may check the header or footer of the incoming e-mail message for a tag that indicates that the message is an interrupt e-mail. These filtering techniques may be used alone or in combination in order to differentiate important e-mails from normal e-mails. If it is determined that the e-mail message is not an interrupt e-mail, the message is accepted by the receiving e-mail client and displayed in the messaging window of the e-mail client in a normal manner (step **806**).

Turning back to step **804**, if the e-mail type is determined to be an interrupt e-mail, a determination is made whether the sender has the authority to issue such an e-mail to the particular recipient (step **808**). This step is performed in order to establish the hierarchical relationship of the e-mail participants. The e-mail client may perform a directory lookup to identify the

Docket No. AUS9200400009US1

relationship of the sender and recipient. Based on the relationship, it may be determined whether the sender has the authority to issue an interrupt e-mail to the recipient. For example, if the employee's manager sends an interrupt e-mail to the employee, then the receiving e-mail client determines that the relationship is such that it handles the e-mail as an interrupt e-mail. However, if the employee sends an interrupt e-mail to the employee's manager, the receiving e-mail client determines that the employee does not have the authority to issue an interrupt e-mail to the manager and handles the e-mail in a normal fashion.

Thus, if it is determined that the sender does not have appropriate authority to issue an interrupt e-mail to the recipient, the message is accepted by the receiving e-mail client and displayed in the inbox of the e-mail client in a normal manner (step **806**).

If it is determined that the sender may issue interrupt e-mails to the recipient, a determination is then made as to whether the desktop is active (step **810**). For example, if the user is currently working on the computer, it is presumed that the desktop is active. In contrast, the desktop is inactive if the user steps away from the computer for a period of time and/or if the user "locks" the computer until the user returns. If it is determined that the desktop is active, the e-mail client automatically displays the content of the e-mail on the client and displays this content in a forefront position of the user interface (step **814**). This content display, such as through a popup window, may contain the e-mail

Docket No. AUS9200400009US1

message content and any pending action required of the recipient. By employing this interrupt e-mail system, the recipient is immediately notified of important messages and may perform the requested action without delay.

Furthermore, the e-mail client may continue to display the interrupt e-mail content on the desktop until the recipient has responded to the e-mail or completed the pending action specified in the e-mail (step **816**). For example, although the recipient may maneuver around a popup window containing the interrupt e-mail (e.g., move another program to a forefront position of the user interface), the recipient may not terminate the popup window without performing the requested action in the e-mail or responding to the e-mail. In this manner, the present invention may force the recipient to perform the action specified in the interrupt e-mail, as well as providing a clear indication that a response from the recipient is still pending.

If it is determined that the desktop is inactive, the display of the interrupt e-mail content may be delayed until the desktop is active (step **812**).

Thus, the present invention provides an e-mail designation mechanism that allows for automatic e-mail response interruption based on user activity. The present invention provides an advantage over existing e-mail system by allowing an authorized sender to issue an interrupt e-mail to a recipient in order to bring an important message to the attention of a recipient. In addition, the mechanism of the present invention requires



Docket No. AUS9200400009US1

the recipient to act upon the interrupt e-mail before being allowed to terminate the automatic e-mail content display. In this manner, critical e-mails and the pending status of the required action may be conveyed to a recipient.

The mechanism of the present invention allows a sender to issue an e-mail message having an interrupt type designation to one or more recipients. The receiving e-mail client filters incoming messages and determines whether an e-mail contains an interrupt designation. If an interrupt designation is found, the e-mail client automatically displays content of the interrupt e-mail and any pending actions required of the recipient, such as through a popup window. This interrupt e-mail content display may be valid until the recipient has responded or completes the pending action specified in the e-mail. Due to the automatic interrupt e-mail display, the recipient is able to quickly and easily view critical e-mail messages, as well as complete the e-mail task or questions.

Furthermore, the use of the interrupt type designation may be controlled based on the sender's authority to issue an interrupt e-mail to a particular recipient. The authority to send an interrupt e-mail to a particular recipient may be predicated on the establishment of an organizational hierarchy based on the user's selection. Client software may perform a directory lookup against the sending and receiving users when a message is delivered. Alternatively, the

Docket No. AUS9200400009US1

authority to override settings may be predicated on an external source, such as a corporate telephone directory.

It is important to note that while the present invention has been described in the context of a fully functioning data processing system, those of ordinary skill in the art will appreciate that the processes of the present invention are capable of being distributed in the form of a computer readable medium of instructions and a variety of forms and that the present invention applies equally regardless of the particular type of signal bearing media actually used to carry out the distribution. Examples of computer readable media include recordable-type media, such as a floppy disk, a hard disk drive, a RAM, CD-ROMs, DVD-ROMs, and transmission-type media, such as digital and analog communications links, wired or wireless communications links using transmission forms, such as, for example, radio frequency and light wave transmissions. The computer readable media may take the form of coded formats that are decoded for actual use in a particular data processing system.

The description of the present invention has been presented for purposes of illustration and description, and is not intended to be exhaustive or limited to the invention in the form disclosed. Many modifications and variations will be apparent to those of ordinary skill in the art. The embodiment was chosen and described in order to best explain the principles of the invention, the practical application, and to enable others of ordinary skill in the art to understand the invention for

Docket No. AUS9200400009US1

various embodiments with various modifications as are suited to the particular use contemplated.